

Probing success in congenital nasolacrimal duct obstruction: An evaluation of age-related outcomes and associated sociodemographic, clinical, maternal, and neonatal variables

Probing success in congenital nasolacrimal obstruction

Ali Hakim Reyhan, Funda Yüksekayla, Müslüm Toptan, İrfan Uzun, Çağrı Mutağ, Büşra Türk
Department of Ophthalmology, Faculty of Medicine, Harran University, Şanlıurfa, Türkiye

Abstract

Aim: Congenital nasolacrimal duct obstruction (CNLDO), which affects 5-20% of newborns, arises from incomplete duct canalization, causing epiphora and mucous discharge. While most cases resolve spontaneously, some require surgical probing. This study examines age-related probing outcomes and their associations with sociodemographic, clinical, maternal, and neonatal factors.

Material and Methods: A retrospective analysis was applied to patients diagnosed with CNLDO who underwent probing. The patients were invited for follow-up examinations, and the parents were administered a questionnaire consisting of 25 items. Patients were divided into three age groups: ≤ 12 , 12-24, and 24-48 months based on surgical timing. Data concerning age at intervention, sociodemographic factors, maternal characteristics, and neonatal parameters were collected and analyzed to determine their impact on probing success rates.

Results: This study of 63 children (78 eyes) undergoing congenital probing revealed an 83.3% overall success rate, with greater success being achieved in younger age groups (<12 months: 91.7%) ($p=0.392$). Right-eye involvement was more common (42.9%), with bilateral involvement accounting for 23.8% of cases. No significant differences were found in demographic, socioeconomic, or perinatal variables across the age groups, except for the age of onset of epiphora. Most children were born at term, breastfed, and had normal birth weights. Maternal education was primarily at the elementary level, and family income shifted from low to moderate in the older groups.

Discussion: Early intervention is critical for optimizing probing success in CNLDO. While sociodemographic, maternal, and neonatal variables exhibited no significant impact, further large-scale, multicenter studies are needed to explore their potential subtle effects.

Keywords

Congenital Nasolacrimal Duct Obstruction, Probing, Age-Related Outcomes, Sociodemographic Factors, Neonatal Variables, Maternal Characteristics

DOI: 10.4328/ACAM.22521 Received: 2024-12-11 Accepted: 2025-01-23 Published Online: 2025-01-30 Printed: 2025-02-01 Ann Clin Anal Med 2025;16(2):146-151

Corresponding Author: Ali Hakim Reyhan, Department of Ophthalmology, Faculty of Medicine, Harran University, Şanlıurfa, Türkiye.

E-mail: alihakimreyhan@gmail.com P: +90 505 097 80 70

Corresponding Author ORCID ID: <https://orcid.org/0000-0001-8402-0954>Other Authors ORCID ID: Funda Yüksekayla, <https://orcid.org/0009-0005-6991-4120> · Müslüm Toptan, <https://orcid.org/0000-0002-9795-8228>İrfan Uzun, <https://orcid.org/0000-0001-6900-6337> · Çağrı Mutağ, <https://orcid.org/0000-0001-6612-8160> · Büşra Türk, <https://orcid.org/0009-0009-9391-9000>

This study was approved by the Ethics Committee of Harran University (Date: 2024-09-23, No: HRÜ/24.14.06)

Introduction

Congenital nasolacrimal duct obstruction (CNLDO) represents one of the most prevalent ocular conditions in infancy and early childhood, affecting approximately 5-20% of newborns [1]. The condition often leads to excessive tearing and mucous discharge, resulting in considerable discomfort for the child and an increased risk of secondary ocular infections capable of compromising children's overall health [2]. CNLDO primarily results from the incomplete canalization of the nasolacrimal duct during embryogenesis, most frequently manifesting as an obstruction at the valve of Hasner at the distal end of the nasolacrimal duct [3].

The natural history of CNLDO demonstrates a high rate of spontaneous resolution, with studies indicating that 70-96% of cases resolve within the first year of life without surgical intervention [4]. Although the majority of cases resolve spontaneously within the first year of life, a significant proportion require interventional treatment, such as probing, to alleviate the obstruction and prevent complications [5,6]. Understanding the factors that affect the success of probing procedures is crucial for optimizing the management and outcomes of patients with CNLDO.

However, for cases that persist beyond the scope of conservative management, probing remains the primary surgical intervention, with success rates varying significantly across different age groups. Recent research suggests that probing success rates decline with age, from 90-100% in infants under 12 months to 56-78% in those older than 24 months [7-9]. When considering outcomes related to age, it is also essential to examine a range of social, clinical, maternal, and newborn factors that may affect the success of probing. For instance, socioeconomic status can affect access to healthcare services, potentially leading to delays in diagnosing and treating CNLDO. Older children may then be treated later, which may adversely impact their recovery. Additionally, factors related to the mother, such as age and health during pregnancy, and newborn-associated conditions may also affect the likelihood of CNLDO. Understanding the issues involved in probing success therefore not only guides clinical choices but also points to the necessity for more research to clarify these links and improve treatment methods.

This study addresses the gap in understanding the relationship between sociodemographic factors, clinical presentations, and treatment success rates in CNLDO across different age groups. It investigates the association between probing success rates and various potential risk factors, including sociodemographic characteristics, clinical presentations, maternal health, and neonatal outcomes, stratified by age. The objective of the research was to identify significant predictors of procedural success through an analysis of these variables across different age cohorts.

Material and Methods

The case records of all patients diagnosed with CNLDO who underwent initial probing procedures in our clinic between January 2022 and June 2024 were reviewed retrospectively. The patients were invited to attend follow-up examinations, and the parents were administered a questionnaire consisting of 25

items. They were categorized into three age groups based on the age at which the surgical probing procedure was performed: 12 months and under, 12-24 months, and 24-48 months.

Ethical approval was obtained from the Harran University ethical committee(Date: 2024-09-23, No: HRÜ/24.14.06).

The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki, and informed consent was obtained from the parents.

The study population consisted of patients who presented with epiphora, underwent fluorescein dye disappearance testing, were diagnosed with CNLDO, and subsequently underwent a first probing procedure. Each child underwent a cycloplegic refraction examination, as well as anterior segment and fundus evaluations. Infants who underwent a second probing procedure, as well as those diagnosed with additional ocular diseases or systemic comorbidities, were excluded from the study.

The probing procedure was performed under general anesthesia in standard operating room conditions. The process began with the dilatation of both puncta using a punctal dilator, followed by an initial irrigation assessment of the nasolacrimal system. A metal probe was introduced perpendicular to the eyelid margin through the punctum, advanced into the ampulla, and then rotated horizontally toward the nasal wall of the lacrimal sac. Upon encountering firm resistance, the probe was rotated 90 degrees and advanced inferiorly through the nasolacrimal duct (figure 1).

The post-procedural treatment regimen included Netilmicin eye drops (four times daily) and Loteprednol eye drops (four times daily) for one week, together with a nasal decongestant spray (used three times daily) for three days. Success in probing was defined as the complete resolution of all clinical signs and symptoms of nasolacrimal duct obstruction observed during follow-up visits conducted three months post-surgery.

The absence of complaints related to tearing, the lack of observed epiphora during examination, and the absence of dye pooling in the fluorescein disappearance test were considered indicators of successful probing. For cases under the age of 2 where obstruction persisted despite the initial probing, a second probing procedure was repeated approximately 2 months later. For cases over the age of 2, silicone tube intubation was performed.

Following the receipt of informed consent from legal guardians, comprehensive data were collected through a systematic review of the patient's medical records. These data included sociodemographic characteristics, including the child's gender and age, maternal characteristics (age, education level, and occupation), family income status, and place of residence. Clinical presentation and management variables were documented, consisting of age at epiphora onset in infants, the initial diagnosis provider, ocular characteristics (laterality, severity, and type of epiphora), pre-surgical medical treatment status, lacrimal sac massage protocols employed, and the frequency of hospital visits before surgical intervention. Perinatal and maternal factors were also recorded, including birth characteristics (weight, gestational age, and mode of delivery), infant feeding patterns, history of admission to the neonatal intensive care unit, mode of conception, and birth order. Additional maternal health parameters were documented,

including infections, medication use during pregnancy, and lifestyle factors such as alcohol consumption and smoking status during pregnancy. This comprehensive dataset was established to facilitate the analysis of factors potentially affecting congenital nasolacrimal duct probing success rates across different age groups.

Statistical analysis was performed on Statistical Package for the Social Sciences version 22.0 software (IBM Corp., Armonk, NY, USA). The distribution of data was evaluated using the Shapiro-Wilk W test, with mean value and standard deviation being calculated for each data set. The Chi-square test of independence was used to assess statistical relationships between groups.

Ethical Approval

Ethical approval for the study was obtained from the Ethics Committee of Harran University (Date: 2024-09-23, No: HRÜ/24.14.06).

Results

This study involved 78 eyes of 63 children who underwent a congenital probing operation. The gender distribution was nearly equal, with 32 girls (50.79%) and 31 (49.21%) boys. Mean ages were 16.33 ± 7.28 months in the patients and 29 ± 4.17 years in the mothers.

Involvement was predominantly in the right eyes (42.9%, n=27), followed by left eye involvement (33.3%, n=21), with bilateral involvement being observed in 23.8% (n=15) of cases (p=0.385). The median follow-up period for the cases was nine months (5-18 months). The first probing operation achieved an overall success rate of 86.9% across all three age groups, and rates of 90.5% in the <12-month age group, 83.3% in the 12–24-month age group, and 75% in the 24–48-month age group (p=0.392).

In the <12-month age group, 2 patients who did not achieve success with the initial probing procedure underwent a second probing procedure approximately three months later.



Figure 1. Intraoperative view of the probing surgical technique. A metal probe is introduced perpendicularly through the selected punctum at the eyelid margin and advanced into the ampulla. The probe is then rotated horizontally and advanced medially until it encounters the nasal wall of the lacrimal sac, confirmed by a firm stop. The image demonstrates the precise positioning of the probe and the surgical field

Following the second probing procedure, these 2 patients experienced complete resolution of their ocular symptoms. In the 12-24-month age group, 3 patients who did not achieve success with the initial probing procedure underwent a second probing procedure approximately three months later. Among these patients, 2 achieved successful outcomes with symptom resolution. However, 1 patient whose symptoms persisted underwent silicone tube intubation three months subsequently. In the 24-48-month age group, 6 patients whose symptoms did not resolve underwent silicone tube intubation. During and after the probing operation for congenital nasolacrimal duct obstruction, no medical complications occurred.

This study analyzed the demographic and socioeconomic characteristics of children and their mothers across three age groups (<12 months, 12-24 months, and 24-48 months), with no significant differences being observed in the variables examined. The mean ages of the children were 10.83, 15.67, and 27 months, respectively (p < 0.05). Gender distribution was balanced, and maternal ages averaged 29.83, 27.67, and 30.25 years, respectively (p=0.88). Mothers were most commonly educated to elementary school level, and no university-level education was reported (p=0.118). Most mothers were housewives (p=0.287), and family income increased from predominantly low in the <12-month group to moderate in the older groups (p=0.378). Urban and rural residency were relatively balanced across all three groups(p=0.455). These findings are presented in Table 1.

The study analyzed clinical, diagnostic, and treatment characteristics of congenital nasolacrimal duct probing across three age groups (< 12 months, 12-24 months, and 24-48 months). The onset age of epiphora showed significant

Table 1. Sociodemographic and Clinical Characteristics by Age Groups in Congenital Nasolacrimal Duct Probing

	<12 month n=21 (%)	12-24 month n=18(%)	24-48 month n=24 (%)	P value
Success rate	19 (90.5%)	15 (83.3%)	18 (75%)	0.392
Child age	10.83(10-11)	15.67 (14-18)	27 (24-32)	< 0.05*
Gender of the child				
Male	11 (52.38%)	8 (44.44%)	12 (50%)	0.88
Female	10 (47.62%)	10 (55.56%)	12 (50%)	
Maternal Age	29.83 (25-36)	27.67 (25-35)	30.25 (23-40)	< 0.05*
Maternal Education Level				
Primary School	12 (57.1%)	12 (66.7%)	15 (62.5)	0.118
Secondary School	6 (28.6%)	0 (0%)	3 (12.5)	
High School	3 (14.3%)	6 (33.3%)	6 (25.0)	
University	0 (0%)	0 (0%)	0 (0.0)	
Occupation of the mother				
Housewife	12 (57.1%)	10 (55.5%)	20 (83.3%)	0.287
Part-time Employed	6 (28.6%)	5 (27.7%)	3 (12.5%)	
Full-time Employed	3 (14.3%)	3 (16.6%)	1 (4.17%)	
Family Income Status				
Low Income	6 (28.5%)	8 (44.4%)	6 (25%)	0.378
Middle Income	15 (71.46%)	10 (55.5%)	18 (75%)	
High Income	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Place of Living				
Urban	10(47.6%)	12 (66.7%)	12 (50)	0.455
Rural	11 (52.4%)	6 (33.3%)	12 (50)	

* Chi-square test

variation ($p < 0.05$), with most cases in younger infants occurring within the first three months, while older infants had a higher proportion of onset after five months. Other factors, such as primary diagnosis provider, laterality, severity, and pre-surgical treatment, showed no significant differences across age groups ($p > 0.05$). The frequency of hospital visits and lacrimal sac massage protocols also remained consistent among the groups. The clinical, diagnostic, and treatment characteristics of congenital nasolacrimal duct probing across different age groups are presented in Table 2.

This study evaluated perinatal and maternal characteristics of children across three age groups: <12 months, 12-24 months, and 24-48 months. Statistical analysis revealed no significant differences in any of the variables examined. Birth weight was predominantly normal in all three groups (85.7%, 94.4%, and 91.7%, respectively) ($p=0.756$). The majority of children were born at term (95.2%, 100%, and 91.7%, respectively) ($p=0.771$) and were breastfed (85.7%, 88.8%, and 83.3%) ($p=0.907$). Hospitalization in the neonatal intensive care unit was uncommon (14.3%, 11.1%, and 16.7%, respectively) ($p=0.970$), and all pregnancies occurred naturally. Pregnancy sequences

varied, with first pregnancies accounting for 28.6%, 22.2%, and 41.7% of cases, respectively ($p=0.673$). Maternal infections were reported in the majority of cases (81.0%, 83.3%, and 91.7%) ($p=0.602$), while medication use during pregnancy was less frequent (23.8%, 44.4%, and 25.0%) ($p=0.297$). No alcohol consumption was reported, and smoking was uncommon (14.3%, 11.1%, and 16.7%) ($p=0.907$). Delivery mechanisms were predominantly natural (66.7%, 66.7%, and 75.0%, respectively) ($p=0.987$). These findings are presented in Table 3.

Discussion

The study findings show that age at epiphora onset is the primary determinant of successful nasolacrimal duct probing in CNLDO, with early-onset cases showing higher complete recovery rates. Notably, neither sociodemographic factors nor perinatal-maternal variables significantly influenced probing success rates. These findings emphasize that early diagnosis and intervention timing are crucial determinants of treatment success in clinical practice.

Valcheva et al. reported an overall success rate for initial probing of 90%. In terms of age groups, the success rate was

Table 2. Clinical, Diagnostic, and Treatment Characteristics by Age Groups in Congenital Nasolacrimal Duct Probing

	<12 month n=21 (%)	12-24month n=18 (%)	24-48month n=24 (%)	p value
Success rate	19 (90.5%)	15(83.3%)	18(75%)	0.392
The Onset Age of Epiphora in Infants				
0-3 months	12(57.1%)	15(83.3%)	9 (37.5%)	<0.05*
3-5 months	9 (42.9%)	3(16.7%)	3 (12.5%)	
>5 months	0(0%)	(0.0%)	12 (50.0%)	
Primary Diagnosis Provider				
Ophthalmologist	18 (85.7%)	15 (83.3%)	19 (79.2%)	0.947
Family practitioner	2 (9.5%)	1 (5.6%)	3 (12.5%)	
Paediatrician	1 (4.8%)	2 (11.1%)	2 (8.3%)	
Laterality				
Right eye	9 (42.9%)	9 (50.0%)	9 (37.5%)	0.385
Left eye	9 (42.9%)	6 (33.3%)	6 (25.0%)	
Both	3 (14.3%)	3 (16.7%)	9 (37.5%)	
Distribution of Epiphora Severity				
Mild	4 (19.0%)	3 (16.7%)	6 (25.0%)	0.442
Moderate	9 (42.9%)	4 (22.2%)	10 (41.7%)	
Severe	8 (38.1%)	11 (61.1%)	8 (33.3%)	
Epiphora Type				
Epiphora with Mucopurulent Discharge	14 (66.7%)	14 (77.8%)	16 (66.7%)	0.738
Isolated Epiphora	7 (33.3%)	4 (22.2%)	8 (33.3%)	
Pre-surgical Medical Treatment Status				
Received medical treatment	19 (90.5%)	15 (83.3%)	20 (83.3%)	0.737
Did not receive medical treatment	2 (9.5%)	3 (16.7%)	4 (16.7%)	
Lacrimal Sac Massage Protocol				
Single daily session (1×(10)/day)	2 (9.5%)	0 (0.0%)	2 (8.3%)	0.675
Twice daily sessions (2×(10)/day)	7 (33.3%)	3 (16.7%)	7 (29.2%)	
Thrice daily sessions (3×(10)/day)	4 (19.0%)	6 (33.3%)	7 (29.2%)	
Four times daily sessions (4×(10)/day)	8 (38.1%)	9 (50.0%)	8 (33.3%)	
Number of Hospital Visits Prior to Operation(per years)				
2 times	3 (14.3%)	3 (16.7%)	2 (8.3%)	0.946
3 times	8 (38.1%)	7 (38.9%)	9 (37.5%)	
4 times	6 (28.6%)	5 (27.8%)	10 (41.7%)	
More than 4 times	4 (19.0%)	3 (16.7%)	3 (12.5%)	
*Chi-square test				

Table 3. Maternal and Neonatal Characteristics Stratified by Age Groups in Congenital Nasolacrimal Duct Probing

Characteristics	<12 month 21 (%)	12-24 month 18 (%)	24-48 month 24 (%)	P value
Success rate	19 (90.5%)	15(83.3%)	18(75%)	0.392
Birth weight				
Normol (>2500gr)	18 (85.7%)	17 (94.4%)	22 (91.7%)	0.756
Low (<2500gr)	3 (14.3%)	1 (5.6%)	2 (8.3%)	
Gestational age				
Term (>37 weeks)	20 (95.2%)	18 (100.0%)	22 (91.7%)	0.771
Preterm (<37 weeks)	1 (4.8%)	0 (0.0%)	2 (8.3%)	
Infant Feeding				
Breastfeeding	18(85.7)	16(88.8%)	20(83.3%)	0.907
Formula feeding	3(14.2%)	2(11.1%)	4(16.6%)	
Hospitalization of the baby in the Neonatal Intensive Care Unit				
No	18 (85.7%)	15 (83.3%)	20 (83.3%)	0.970
Yes	3 (14.3%)	3 (16.7%)	4 (16.7%)	
Way of becoming pregnant				
Natural	21(100.0%)	18 (100.0%)	24 (100.0%)	NA
In vitro	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Sequence of pregnancy				
First	6 (28.6%)	4 (22.2%)	10 (41.7%)	0.673
Second	7 (33.3%)	5 (27.8%)	6 (25.0%)	
Third and more	8 (38.1%)	9 (50.0%)	8 (33.3%)	
Maternal infection				
No	4 (19.0%)	3 (16.7%)	2 (8.3%)	0.602
Yes	17 (81.0%)	15 (83.3%)	22 (91.7%)	
Consuming medications				
No	16 (76.2%)	10 (55.6%)	18 (75.0%)	0.297
Yes	5 (23.8%)	8 (44.4%)	6 (25.0%)	
Alcohol				
No	21 (100.0%)	18 (100.0%)	24 (100.0%)	NA
Yes	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Smoking				
Non-smoker	18 (85.7%)	16 (88.9%)	20 (83.3%)	0.907
Smoker	3 (14.3%)	2 (11.1%)	4 (16.7%)	
Birth mechanism				
Natural	14 (66.7%)	12 (66.7%)	18 (75.0%)	0.987
Cesarean Section	7 (33.3%)	6 (33.3%)	8 (33.3%)	

*Chi-square test

89% for patients aged 2–12 months and 94% for those aged 13–41 months. While these results are similar to the success rate of 90.5% observed in the present study for the < 12-month group, Valcheva et al. achieved a comparable success rate (94%) even in older age groups. In contrast, our findings revealed a decline in success rates to 83.3% in the 12–24 month group and 75% in the 24–48 month group. The results of Valcheva et al's study suggest that probing can still achieve a high success rate in older age groups [10]. This discrepancy between the two studies may be attributed to methodological differences in case selection, the demographic and clinical characteristics of the patient population, variations in surgical techniques, and differences in follow-up durations. Świerczyńska et al.'s study demonstrated that the success rate of initial probing procedures for nasolacrimal duct obstruction significantly declines with increasing age [9]. Their research, which included patients aged two weeks to 41 months, reported an overall success rate of 87.2%, with notably higher success

rates in infants under six months and a marked increase in failure risk for children over two years. Similarly, the current study corroborates these findings, showing an age-dependent decrease in success rates: 91.7% in the <12-month group, 81.0% in the 12–24-month group, and 78.8% in the 24–48-month group. These results collectively reinforce the widely accepted notion that advancing age adversely impacts the effectiveness of probing as the initial surgical intervention for nasolacrimal duct obstruction.

The existing literature acknowledges probing as a standard treatment option for CNLDO, although there is no consensus regarding the optimal timing [11-17]. Świerczyńska et al. reported the lowest failure rates (8.6%) in patients aged 3–6 months, with success rates declining in older age groups, consistent with the present study [9]. Sathiamoorthi et al. identified 9–15 months as the optimal probing period, noting an 85% likelihood of spontaneous duct opening within the first two months of life, which declines thereafter and plateaus beyond nine months [18]. The research also confirmed that performing probing after 15 months of age is associated with a markedly reduced success rate.

Some researchers advocate delaying nasolacrimal duct probing until later stages [19-21]. A prospective cohort study conducted by the Pediatric Eye Disease Investigator Group (PEDIG) determined no correlation between age at probing and the success rate of the procedure in children up to 36 months of age [14]. Some ophthalmologists contend that probing efficacy is independent of patient age, attributing surgical outcomes primarily to the nature of the underlying obstruction rather than the timing of intervention [19-22]. Retrospective studies, however, indicate that higher failure rates in older age groups may result from self-selection processes. Medghalchi et al. reported a 91% success rate for probing performed after six months in cases of simple obstruction at the valve of Hasner, compared to only 52% in patients with more complex obstructions [23]. Additionally, Kashkouli et al. observed significantly lower success rates in late and very late probing for complex obstructions (33.3%) compared to membranous obstructions (90.2%) [22].

Bilateral nasolacrimal duct obstruction, reported in 9–47.5% of cases, is often associated with more complex underlying causes [10,13,14,19-24]. This condition can pose greater technical challenges during procedures performed under local anesthesia, potentially leading to less favorable outcomes. This observation aligns well with the findings of both the present study and those of other researchers [13-21]. Additionally, Dietze et al. emphasized that factors such as trisomy 21, allergic rhinitis or seasonal allergies, a history of upper respiratory tract infections within the previous month, and obstructive sleep apnea may increase the likelihood of probing failure [25].

The findings of this study confirm that the most influential factor determining probing success in CNLDO is the age at which the procedure is performed, which is closely linked to the onset of epiphora, with earlier procedures yielding higher success rates. Notably, no significant correlations were found between procedural outcomes and various factors, including sociodemographic characteristics, maternal health parameters, and neonatal variables. While these findings suggest these

factors may not critically influence therapeutic success, the limited scope of existing research in this area indicates a need for larger-scale, multicenter studies to better understand potential subtle influences on outcomes and develop more personalized treatment approaches.

Limitation

This study has several limitations that may affect the interpretation of its findings. The small sample size and single-center design limit the generalizability of the results to broader populations and sociocultural contexts. The retrospective nature of the study introduces a risk of selection bias due to reliance on previously recorded data. Additionally, variability in surgical techniques and the differing levels of surgeon experience may have influenced the outcomes.

Conclusion

This study demonstrates that early probing of the nasolacrimal duct in cases of CNLDO leads to higher success rates, while delayed intervention is associated with reduced efficacy. The study findings indicate that sociodemographic, maternal, and neonatal characteristics do not significantly affect the success of probing, whereas age at the onset of epiphora emerged as a critical predictive factor. These results underscore the importance of early diagnosis and prompt intervention to optimize patient outcomes and shape future management strategies in cases of CNLDO.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and Human Rights Statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Funding: None

Conflict of Interest

The authors declare that there is no conflict of interest.

References

1. Lin AE, Chang YC, Lin MY, Tam KW, Shen YD. Comparison of treatment for congenital nasolacrimal duct obstruction: a systematic review and meta-analysis. *Can J Ophthalmol*. 2016;51(1):34-40.
2. Schellini SA, Marques-Fernandez V, Meneghim RLFS, Galindo-Ferreiro A. Current management strategies of congenital nasolacrimal duct obstructions. *Expert Rev Ophthalmol*. 2021;16(5):377-85.
3. Zhang C, Yu G, Cui Y, Wu Q, Wei W. Anatomical characterization of the nasolacrimal canal based on computed tomography in children with complex congenital nasolacrimal duct obstruction. *J Pediatr Ophthalmol Strabismus*. 2017;54(4):238-43.
4. Vagge A, Ferro Desideri L, Nucci P. Congenital Nasolacrimal Duct Obstruction (CNLDO): A Review. *Diseases*. 2018;6(4):96.
5. Kashkouli MB, Karimi N, Khademi B. Surgical management of congenital nasolacrimal duct obstruction; one procedure for all versus all procedures for one. *Curr Opin Ophthalmol*. 2019;30(5):364-71.
6. Repka MX. Timing of simple probing for congenital nasolacrimal duct obstruction: Not so simple. *JAMA Ophthalmol*. 2018;136(11):1286-7.
7. Beato J, Mota Á, Gonçalves N, Santos-Silva R, Magalhães A, Breda J, et al. Factors predictive of success in probing for congenital nasolacrimal duct obstruction. *J Pediatr Ophthalmol Strabismus*. 2017;54(2):123-7.
8. Takahashi Y, Kakizaki H, Chan WO, Selva D. Management of congenital nasolacrimal duct obstruction. *Acta Ophthalmol*. 2010;88(5):506-13.
9. Świerczyńska M, Tobczyk E, Rodak P, Barchanowska D, Filipek E. Success rates of probing for congenital nasolacrimal duct obstruction. *Eur J Ophthalmol*. 2020;30(6):1325-30.
10. Valcheva KP, Murgova SV, Krivosheiska EK. Success Rate of Probing for Congenital Nasolacrimal Duct Obstruction in Children. *Folia Med (Plovdiv)*. 2019;61(1):97-103.

11. Xiang Q, Gao X, Chen X, Qi J, Fang J. Nasolacrimal Duct Probing for Young Children With Congenital Nasolacrimal Duct Obstructions in China: A 10-Year Systematic Review. *J Pediatr Ophthalmol Strabismus*. 2019;56(6):365-72.
12. Young JD, MacEwen CJ. Managing congenital lacrimal obstruction in general practice. *BMJ*. 1997;315(7103):293-6.
13. Repka MX, Chandler DL, Beck RW, Crouch ER, Donahue S, Holmes JM, et al. Primary treatment of nasolacrimal duct obstruction with probing in children younger than 4 years. *Ophthalmology*. 2008;115(3):577-84.
14. Pediatric Eye Disease Investigator Group. Resolution of congenital nasolacrimal duct obstruction with nonsurgical management. *Arch Ophthalmol*. 2012;130(6):730-4.
15. Moscato EE, Kelly JP, Weiss A. Developmental anatomy of the nasolacrimal duct: implications for congenital obstruction. *Ophthalmology*. 2010;117(12):2430-4.
16. Bach A, Vanner EA, Warman R. Efficacy of Office-Based Nasolacrimal Duct Probing. *J Pediatr Ophthalmol Strabismus*. 2019;56(1):50-4.
17. Paul TO, Shepherd R. Congenital nasolacrimal duct obstruction: natural history and the timing of optimal intervention. *J Pediatr Ophthalmol Strabismus*. 1994;31(6):362-7.
18. Sathiamoorthi S, Frank RD, Mohny BG. Spontaneous resolution and timing of intervention in congenital nasolacrimal duct obstruction. *JAMA Ophthalmol*. 2018;136(11):1281-6.
19. Arora S, Koushan K, Harvey JT. Success rates of primary probing for congenital nasolacrimal obstruction in children. *J AAPOS*. 2012;16(2):173-6.
20. Eshragi B, Fard MA, Masomian B, Akbari M. Probing for congenital nasolacrimal duct obstruction in older children. *Middle East Afr J Ophthalmol*. 2013;20(4):349-52.
21. Miller AM, Chandler DL, Repka MX, Hoover DL, Lee KA, Melia M. Office probing for treatment of nasolacrimal duct obstruction in infants. *J AAPOS*. 2014;18(1):26-30.
22. Kashkouli MB, Beigi B, Parvaresh MM, Kassae A, Tabatabaee Z. Late and very late initial probing for congenital nasolacrimal duct obstruction: what is the cause of failure? *Br J Ophthalmol*. 2003;87(9):1151-3.
23. Medghalchi A, Mohammadi MJ, Soltani Moghadam R, Dalili H. Results of nasolacrimal duct probing in children between 9-48 months. *Acta Med Iran*. 2014;52(7):545-51.
24. Perveen S, Sufi AR, Rashid S, Khan A. Success rate of probing for congenital nasolacrimal duct obstruction at various ages. *J Ophthalmic Vis Res*. 2014;9(1):60-9.
25. Dietze J, Suh D. Risk Factors for Poor Surgical Outcome of Pediatric Nasolacrimal Duct Obstruction. *J Pediatr Ophthalmol Strabismus*. 2019;56(4):261-64.

How to cite this article:

Ali Hakim Reyhan, Funda Yüksekayla, Müslüm Toptan, İrfan Uzun, Çağrı Mutaf, Büşra Türk. Probing success in congenital nasolacrimal duct obstruction: An evaluation of age-related outcomes and associated sociodemographic, clinical, maternal, and neonatal variables. *Ann Clin Anal Med* 2025;16(2):146-151

This study was approved by the Ethics Committee of Harran University (Date: 2024-09-23, No: HRÜ/24.14.06)